CLAIMS

1. A communication system comprising:

a first device transmitting a modulated signal; and

a second device receiving the modulated signal, the second device including

a first demodulator receiving the modulated signal, producing a first demodulated output and implementing a first demodulation technique,

a second demodulator receiving the modulated signal, producing a second demodulated output and implementing a second demodulation technique, the second demodulation technique differing from the first demodulation technique, and

an error detection module performing bit error detection based on the first demodulated output and the second demodulated output.

2. The communication system as set forth in claim 1, and wherein the first demodulation technique is differential-frequency shift keying and the second demodulation technique is offset quadrature phase shift keying.

3. The communication system as set forth in claim 1, and wherein the modulated signal is modulated using a packetized protocol.

4. The communication system as set forth in claim 3, and wherein the error detection module performs bit error detection by comparing the first demodulator output with the second demodulator output on a packet-by-packet basis.

5. The communication system as set forth in claim 1, and wherein the first device implements a frequency shift keying modulation technique.

6. The communication system as set forth in claim 5, and wherein the first device uses a non-minimum shift keying nominal modulation index.

7. A method of transferring data via a radio frequency signal, the method comprising:

converting data into a digital signal;

modulating the digital signal using a packetized protocol to generate a modulated signal;

wirelessly transferring the modulated signal;

receiving the modulated signal;

demodulating the modulated signal to produce a demodulated signal; and

implementing an error detection algorithm.

8. The method of claim 7, and further comprising demodulating the modulated signal using a first demodulation technique and a second demodulation technique, the first demodulation technique producing a first demodulated signal and the second demodulation technique producing a second demodulated signal.

9. The method of claim 8, and further comprising implementing an error detection algorithm based on the first demodulated signal and the second demodulated signal.

10. The method of claim 9, and further comprising comparing the first demodulated signal with the second demodulated signal on a packet-by-packet basis.

11. The method of claim 9, and wherein implementing an error detection algorithm includes outputting a second digital signal based on the first demodulated signal and the second demodulated, the second digital signal being substantially identical to the first digital signal.

12. A method for performing estimations of modulation signal parameters upon reception of a transmitted signal, the method comprising:

demodulating the transmitted signal to produce a digital signal having a plurality of bits;

determining if the plurality of bits contains a first pattern of bits or a second pattern of bits; and

performing a modulation signal parameter estimation if the plurality of bits contains a first pattern of bits or a second pattern of bits.

13. The method of claim 12, and wherein the first pattern of bits includes identical bits.

14. The method of claim 12, and wherein the second pattern of bits includes alternating bits.

15. The method of claim 12, and further comprising determining if the plurality of bits contains a first pattern of identical bits or a second pattern of alternating bits.

16. The method of claim 15, and further comprising performing one of a modulation index estimation if the plurality of bits contains a first pattern of identical bits and performing 3-dB bandwidth-bit-duration product estimation if the plurality of bits contains a second pattern of alternating bits.

17. The method of claim 12, and further comprising performing a modulation index estimation and a 3-dB bandwidth-bit-duration product estimation.

18. The method of claim 12, and further comprising performing one of a modulation index estimation if the plurality of bits contains a first pattern of bits and a 3-dB bandwidth-bit-duration product estimation if the plurality of bits contains a second pattern of bits.

19. A method of shifting an input of an equalizer in a communication system, the method comprising:

receiving an input signal including a first time interval and a second time interval, the first time interval preceding the second time interval, the first time interval including a first input value and the second time interval including a second input value;

receiving at least one estimated parameter of the input signal;

determining a first output value based at least in part on the at least one estimated parameter and the first input value;

calculating a shift value based at least in part on the first output value; and

shifting the second input value by the shift value to determine a second output value during the second time interval.

20. The method of claim 19, and further comprising receiving an input signal including a first phase increment for the first input value and a second phase increment for the second input value.

21. The method of claim 20, and further comprising determining a first decision statistic for the first output value and a second decision statistic for the second output value.

22. The method of claim 19, and further comprising receiving a first estimated parameter of the input signal and a second estimated parameter of the input signal; and calculating the shift value based at least in part on the first estimated parameter, the second estimated parameter, and the first output value.

23. The method of claim 22, and further comprising receiving a first estimated parameter and a second estimated parameter, one of the first estimated parameter and the second estimated parameter including an estimated bandwidth-bit-duration product of the input signal.

24. The method of claim 23, and further comprising receiving a first estimated parameter and a second estimated parameter, one of the first estimated parameter and the second estimated parameter including an estimated modulation index of the input signal.

25. The method of claim 22, and further comprising receiving a first estimated parameter and a second estimated parameter, one of the first estimated parameter and the second estimated parameter including an estimated modulation index of the input signal.

26. The method of claim 19, and further comprising receiving at least one estimated parameter of the input signal; and determining the second output value based at least in part on the first output value and the at least one estimated parameter.

27. The method of claim 26, and further comprising receiving a first estimated parameter of the input signal and a second estimated parameter of the input signal, the first estimated parameter differing from the second estimated parameter; and determining the second output value based at least in part on the first output value, the first estimated parameter, and the second estimated parameter.

28. A method of estimating a carrier offset of a modulated signal, the method comprising:

receiving an input signal having a first input value during a first time interval and a second input value during a second time interval, the first time interval preceding the second time interval;

receiving a first estimated parameter of the modulated signal;

receiving a second estimated parameter of the modulated signal;

calculating an estimated signal during the second time interval,

the estimated signal being a substantially noiseless estimation of a phase increment of the modulated signal,

the estimated signal based at least in part on the first input value, the first estimated parameter, and the second estimated parameter;

generating an error signal by combining the second input value with the estimated signal; and

determining a carrier offset during the second time interval based at least in part on the error signal.

29. The method of claim 28, and further comprising receiving an input signal having a first input value including a plurality of bits.

30. The method of claim 28, and further comprising receiving a first estimated parameter including an estimated modulation index of the input signal.

31. The method of claim 28, and further comprising receiving a second estimated parameter including an estimated bandwidth-bit-duration product of the input signal.

32. The method of claim 28, and further comprising receiving a second input signal representing a phase increment of the modulated signal; and

calculating an estimated signal during the second time interval,

the estimated signal being a substantially noiseless estimation of a phase increment of the modulated signal,

the estimated signal based at least in part on the first input value, the first estimated parameter, the second estimated parameter, and second input signal.

33. A method of calculating an estimation of a modulated signal, the method comprising:

receiving a first input signal having L input values during L time intervals;

receiving a first estimated parameter of the modulated signal;

receiving a second estimated parameter of the modulated signal;

receiving a second input signal representing a carrier-offset-corrected phase increment according to an estimated carrier offset of the modulated signal; and

calculating an estimated signal, the estimated signal being a substantially noiseless estimation of an actual phase increment of the modulated signal.